

FILE 'HCAPLUS' ENTERED AT 16:46:09 ON 24 AUG 2005

E US2003-0626336/PRN,AP
L1 1 S (US2003-626336/PRN OR US2003-626336/AP)
L2 SEL PLU=ON L1 1- RN : 6 TERMS
L3 652595 S L2
L4 1 S L1 AND L3
D ALL HITSTR
L5 SEL PLU=ON L4 1- NCL ECLA IC : 3 TERMS
L6 13820 S OXIDIZING AGENTS/IT
L7 363 S PEROXIDES, PROCESSES/IT
L8 771 S VAPOR DEPOSITION PROCESSES(L) PHYSICAL
S (7440-21-3/REG# OR SI OR SILICON OR SEMICOND##### OR METHO

FILE 'REGISTRY' ENTERED AT 16:50:17 ON 24 AUG 2005

L9 1 S 7440-21-3/RN

FILE 'HCAPLUS' ENTERED AT 16:50:17 ON 24 AUG 2005

L10 419116 S L9
L11 754 S L5
L12 754 S L5
L13 754 S L5
L14 975146 S (L10 OR SI OR SILICON OR SEMICOND#####
OR METHOD OR L13) AND (AQ OR WATER OR H2O OR LIQUID)
S (L10 OR SI OR SILICON OR SEMICOND##### OR METHOD OR L5) AND

FILE 'REGISTRY' ENTERED AT 17:00:09 ON 24 AUG 2005

L15 1 S 7722-84-1/RN

FILE 'HCAPLUS' ENTERED AT 17:00:10 ON 24 AUG 2005

L16 88896 S L15

FILE 'REGISTRY' ENTERED AT 17:00:10 ON 24 AUG 2005

L17 1 S 10028-15-6/RN

FILE 'HCAPLUS' ENTERED AT 17:00:10 ON 24 AUG 2005

L18 58224 S L17
L19 754 S L5
L20 76649 S (L10 OR SI OR SILICON OR SEMICOND#####
OR METHOD OR L19) AND ((L6 OR L7) OR PEROXIDE OR H2O2 OR OZONE
OR L18 OR OXIDIZER OR OXIDISER OR L16)
L21 59438 S (PRECURSOR OR ORGANOMETAL##### OR
METAL##### (7A) (OXIDIS? OR OXIDIZ? OR OXIDED OR OXIDATE OR
OXIDATED OR OXIDATING OR OXIDATION OR OXYGENAT#####)
L22 165141 S (PRECURSOR OR ORGANOMETAL##### OR
METAL##### (7A) (AQ OR WATER OR H2O OR LIQUID)

L23 3 S L14 AND L18 AND L19
L24 4798 S L14 AND L18 AND L20
L25 98 S L14 AND L18 AND L21
L26 209 S L14 AND L18 AND L22
L27 98 S L24 AND L25
L28 209 S L24 AND L26
L29 42 S L25 AND L26
L30 42 S L27 AND L28 AND L29
L31 45 S L23 OR L30
L32 44 S L31 NOT L4
L33 0 S DIRECTLY AND L32
L34 19 S (METAL##### OR ORGANOMETAL? OR PRECURSOR) (5
A) (SUBSTRATE OR PLATE OR SLAB OR DIE OR WAFER OR SEMICONDUCT##
OR SI OR SILICON) AND L32
D ALL HITSTR TOT

L35 20 S (LIQUID OR AQUEOUS OR SOLUTION) (4A) (OXID##
OR OXYGEN##### OR PEROXIDE OR H2O2) AND L32
L36 10 S L35 NOT L34
L37 13 S L32 AND (PRECURSOR OR ORGANOMETAL? OR
ORGANO METAL##### OR ORGANIC## (2A) METAL#####)
L38 2 S L37 NOT (L35 OR L34)

FILE 'HCAPLUS' ENTERED AT 17:00:10 ON 24 AUG 2005

L39 161 S OXID#####(5A)DIRECTLY(5A)SUBSTRATE
 L40 0 S L39 AND (L6 OR L7 OR L8)
 L41 43 S L39 AND L3
 L42 36 S L39 AND (L10 OR L11 OR L12 OR L13 OR L14)
 L43 14 S L39 AND (L16 OR (L18 OR L19 OR L20 OR L21
 OR L22 OR L23 OR L24 OR L25 OR L26 OR L27 OR L28 OR L29 OR L30
 OR L31 OR L32 OR L33 OR L34 OR L35 OR L36 OR L37))
 L44 54 S (L41 OR L42 OR L43) NOT (L38 OR L35 OR
 L34)
 L45 11 S L44 AND (LIQUID OR AQUEOUS OR SOLUTION OR
 WATER OR H2O)
 L46 5 S L44 AND PRECURSOR
 L47 13 S (L45 OR L46)
 D ALL HITSTR TOT
 L48 85 S (L41 OR L42 OR L43) OR L38 OR L35 OR L34
 L49 SEL PLU=ON L48 1- PRN : 75 TERMS

FILE 'WPIX, JAPIO, EPFULL, PCTFULL' ENTERED AT 17:12:03 ON 24 AUG 2005

L50 104 S L49
 L51 17 S L50 AND DIRECTLY
 L52 2 S L50 AND DIRECT(5A)(SUBSTRATE OR WAFER OR
 PLATE OR SILICON OR SI OR SEMICONDUCT#####)
 L53 19 S (L51 OR L52)
 D BIB AB KWIC 1-19
 L54 1316 S METAL#####(8A) PRECURSOR(8A) SUBSTRATE

FILE 'HCAPLUS' ENTERED AT 17:17:04 ON 24 AUG 2005

L55 SEL PLU=ON L4 1- IC : 1 TERM

FILE 'WPIX, JAPIO, EPFULL, PCTFULL' ENTERED AT 17:17:18 ON 24 AUG 2005

L56 976 S L55
 L57 7 S L56 AND L54
 L58 7 S L57 NOT L53
 D BIB AB KWIC 1-7

Renshaw

163706

SEARCH REQUEST FORM Scientific and Technical Information Center - EIC2800
 Rev. 3/15/2004 This is an experimental format -- Please give suggestions or comments to Jeff Harrison, JEF-4B68, 272-2511.

Date	8/24/05	Serial #	10/626,336	Priority Application Date	7/24/03
Your Name	ORI NAOAV		Examiner #	75025	
AU	2811	Phone	272-1660	Room	7A39
In what format would you like your results? Paper is the default.					
<input checked="" type="radio"/> PAPER <input type="radio"/> DISK <input type="radio"/> EMAIL					

If submitting more than one search, please prioritize in order of need.

The EIC searcher normally will contact you before beginning a prior art search. If you would like to alert a searcher for an interactive search, please notify one of the searchers.

Where have you searched so far on this case?

Circle: USPTO DWPI EPO Abs JPO Abs IBM TDB

Other:

What relevant art have you found so far? Please attach pertinent citations or Information Disclosure Statements. 1P02001123293A

What types of references would you like? Please checkmark:

<input checked="" type="checkbox"/> Primary Refs	<input type="checkbox"/> Nonpatent Literature	<input type="checkbox"/> Other
<input type="checkbox"/> Secondary Refs	<input type="checkbox"/> Foreign Patents	<input type="checkbox"/>
<input type="checkbox"/> Teaching Refs	<input type="checkbox"/>	<input type="checkbox"/>

What is the topic, such as the novelty, motivation, utility, or other specific facets defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, registry numbers, definitions, structures, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract and pertinent claims.

Metallic precursor directly on semiconductor substrate, and oxidizing the metallic precursor in a liquid, i.e.

reacted oxidizing metal in liquid wherein the metal is located directly on a semiconductor substrate

Acting SPE: Steve Lake

Staff Use Only	Type of Search	Vendors
Searcher	Structure (II)	<input checked="" type="checkbox"/> STN
Searcher Phone:	Bibliographic	<input checked="" type="checkbox"/> Dialog
Searcher Location:	Patentation	<input type="checkbox"/> Questel/Oasis
Date Searcher Picked Up:	Fulltext	<input type="checkbox"/> Lexis-Nexis
Date Completed:	Patent Family	<input type="checkbox"/> WWW/Internet
Searcher Prep/Rev Time:	Other	<input type="checkbox"/> Other
Online Time:		

L34 ANSWER 11 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2001:611680 HCAPLUS

DN 135:188740

ED Entered STN: 23 Aug 2001

TI Liquid delivery MOCVD process for deposition of high frequency dielectric materials

IN Stauf, Gregory T.; Roeder, Jeffrey F.; Baum, Thomas H.

PA Advanced Technology Materials, Inc., USA

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6277436	B1	20010821	US 1998-216673	19981218
	US 5932905	A	19990803	US 1997-979684	19971126
	WO 2000037712	A1	20000629	WO 1999-US29566	19991213
PRAI	US 1997-979684	A2	19971126		
	US 1998-216673	A	19981218		

AB A liq. delivery MOCVD method for deposition of dielec.

materials such as (Ba,Sr) titanates and (Zr,Sn) titanates, in which metal source compds. are dissolved or suspended in solvent and flash vaporized at temps. of from .apprx.100.degree. to .apprx.300.degree. and carried via a carrier gas such as Ar, N₂, He, NH₃ or the like, into a CVD reactor in which the precursor vapor is mixed with an oxidizing co-reactant gas such as O₂, ozone, N₂O, etc., to deposit the high dielec. metal oxide film on the substrate at a temp. of from .apprx.400.degree. to .apprx.1200.degree. at a CVD chamber pressure of from .apprx.0.1 torr to .apprx.760 torr. Such process may e.g. be employed to form a (Ba,Sr) titanate dielec. material in which .gtoreq.60 at of the total metal content of the oxide is Ti. The high dielec. material of the invention may be used to form capacitive microelectronic device structures for applications such as dynamic random access memories and high frequency capacitors.

IT Oxides (inorganic), processes

(liq. delivery MOCVD process for deposition of high frequency dielec. materials)

IT Vapor deposition process

(metalorg., liq. delivery; liq. delivery

MOCVD process for deposition of high frequency dielec. materials)

IT Transition metal complexes

RL: RCT (Reactant); RACT (Reactant or reagent)

(polyamine, vapor deposition precursor; liq.

delivery MOCVD process for deposition of high frequency dielec. materials)

IT 7440-21-3, Silicon, processes

RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(liq. delivery MOCVD process for deposition of high frequency dielec. materials)

RN 7440-21-3 HCAPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

IT 10028-15-6, Ozone, processes

RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(vapor deposition carrier gas; liq. delivery MOCVD process for deposition of high frequency dielec. materials)

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

0_0_0

L47 ANSWER 6 OF 13 HCPLUS COPYRIGHT ACS on STN
AN 2002:776485 HCPLUS
ED Entered STN: 11 Oct 2002
TI Aqueous chemical growth of 3-D arrays of metal oxide
nanomaterials
AU Vayssières, Lionel
CS Department of Physics and Physical Chemistry, Uppsala University, SE-75121
Uppsala, Swed.
SO Abstracts of Papers, 224th ACS National Meeting, Boston, MA, United
States, August 18-22, 2002 (2002), PHYS-146 Publisher: American Chemical
Society, Washington, D. C.
CODEN: 69CZPZ
DT Conference; Meeting Abstract
LA English
AB Ordered purpose-built nanomaterials have been obtained by a novel
synthesis and theor. concept which consists of growing metal oxide
thin films directly onto substrates at pptn. and
dispersion conditions yielding to thermodn. colloidal stability (i.e. low
interfacial tension). Such specific state is reached by controlling
exptl. (i.e. chem. and electrostatically) the interfacial tension of the
system as described quant. by a thermodn. model based on Gibbs adsorption
equation. The outcome allows the fabrication of nano- to microparticulate
thin films of metal oxides with controlled particle size, morphol. and
nanoparticle orientation onto substrates without template or surfactant.
Cryst. 1D nanorods of iron oxides (hematite and akaganeite) assembled into
3D bundles with controlled parallel and perpendicular orientation, 3D
array of corundum chromium oxide-iron oxide nanocomposite, and highly
oriented 3D nanorod-array of ZnO have been obtained onto various (single
and polycryst.) substrates from the condensation of metal salts
in aq. soln. at low temp.

L47 ANSWER 3 OF 13 HCAPLUS COPYRIGHT ACS on STN
 AN 2004:217358 HCAPLUS
 DN 140:243895
 ED Entered STN: 18 Mar 2004
 TI Method and apparatus for plasma vapor deposition of metal oxide films or metal nitride films
 IN Sakamoto, Hitoshi; Ogura, Ken; Oba, Yoshiyuki; Nishimori, Toshihiko; Yahata, Naoki
 PA Mitsubishi Heavy Industries, Ltd., Japan

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2004083945	A2	20040318	JP 2002-243240	20020823
PRAI JP 2002-243240		20020823		

 AB The metal oxide film is formed by a process including steps of (1) supplying halogen gas into a chamber and converting it to plasma which etches a metal member disposed at a position facing to a substrate so as to form a metal halide as a precursor of a metal film, (2) allowing to deposit a metal film while keeping the substrate temp. lower than that of the metal member, and (3) supplying oxygen gas (plasma) to oxidize the metal film into metal oxide film.
 In the process, halogen plasma and oxygen gas/plasma may be simultaneously supplied to form a metal film (on the substrate) is subjected to oxidn. or to directly form a metal oxide film. Alternatively, a metal halide is allowed to be adsorbed on the substrate in 2, then the halide is oxidized with oxygen gas plasma to give metal oxide film. Also claimed is formation of a metal nitride film in the same way, but by using nitrogen gas instead of oxygen gas. The formed metal oxide or nitride film has high crystallinity and stable compns.
 IT 1314-23-4P, Zirconium oxide, preparation 1314-61-0P,
 Tantalum oxide 12055-23-1P, Hafnium oxide
 (films; plasma vapor deposition of metal oxide or metal nitride film by forming metal halide and subsequent oxidn. or nitridation)
 RN 1314-23-4 HCAPLUS
 CN Zirconium oxide (ZrO₂) (8CI, 9CI) (CA INDEX NAME)

O—Zr—O

RN 1314-61-0 HCAPLUS
 CN Tantalum oxide (Ta₂O₅) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 12055-23-1 HCAPLUS
 CN Hafnium oxide (HfO₂) (8CI, 9CI) (CA INDEX NAME)

O—Hf—O

L58 ANSWER 6 OF 7 WPIX COPYRIGHT THE THOMSON CORP on STN
AN 1992-398629 [48] WPIX
CR 1991-200636 [27]
DNN N1992-304110 DNC C1992-176815
TI Forming metal oxide coatings for range of substrate types - by
coating substrate surface with polymer metal complex
precursor soln. and firing to achieve specific properties in oxide
coatings.
DC A82 L03 M13 P42 P73 U11 U12 X15
IN CHIEN, J C W; GONG, B
PA (SCSC-N) ACAD APPLIED SCI; (CHIE-I) CHIEN J C W; (GONG-I) GONG B
CYC 17
PI WO 9219391 A1 19921112 (199248)* EN 24
RW: AT BE CH DE DK ES FR GB GR IT LU MC NL SE
W: CA JP
US 5318800 A 19940607 (199422) 5
ADT WO 9219391 A1 WO 1992-US3505 19920428; US 5318800 A CIP of US 1989-407912
19890915, Cont of US 1991-693431 19910429, US 1992-997118 19921224
FDT US 5318800 A CIP of US 5024894
PRAI US 1991-693431 19910429
AB WO 9219391 A UPAB: 19940727
Thin, uniform, aberration-resistant and hole-free, high-temp. thermally
stable metal oxide coatings are formed on a substrate by:- (1)
forming a polymer-metal-complex precursor soln., (2)
coating the precursor soln. after filtration uniformly over the
substrate surface, (3) firing the coated substrate in an air or
oxygen furnace to oxidise the metal in the coating while burning off all
traces of the polymer and (4) cooling to provide a hard metal oxide
coating of submicron or micron range thickness adhered to the substrate
surface. Pref. the substrate can be either conducting, semiconducting or
insulating.
USE/ADVANTAGE - The coating provides one or more of insulation, water
surfacing, thermal barrier and rust or other oxidn. resistance for a metal
substrate, or conductivity for an insulating substrate (all claimed). The
coating method is both less complex and costly than prior art techniques
such as e.g. sputtering or CVD.
Dwg. 0/0

L58 ANSWER 2 OF 7 WPIX COPYRIGHT THE THOMSON CORP on STN
 AN 1996-455717 [45] WPIX
 CR 1990-238925 [31]; 1992-316377 [38]; 1993-214414 [26]; 1993-214416 [26];
 DNN N1996-383960 DNC C1996-142978
 TI Prodn. of a layered superlattice material for a ferroelectric device - by applying a thin layer of precursor soln. of polyoxyalkylated metals including strontium and bismuth and at least one other, to a substrate and baking.
 DC L03 U11 U14
 IN ITO, T; McMILLAN, L D; PAZ DE ARAUJO, C A; SCOTT, M C; YOSHIMORI, H
 PA (OLYU) OLYMPUS CORP; (SYME-N) SYMETRIX CORP; (OLYU) OLYMPUS OPTICAL CO LTD
 CYC 20
 PI WO 9630938 A2 19961003 (199645)* EN 77
 RW: AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE
 W: JP KR
 WO 9630938 A3 19961205 (199712)
 EP 815589 A1 19980107 (199806) EN
 R: AT BE DE FR GB IE IT NL
 JP 11502375 W 19990223 (199918) 83
 KR 98702980 A 19980905 (199938)
 US 6072207 A 20000606 (200033) <--
 KR 433819 B 20040716 (200474)
 PRAI US 1995-405953 19950317; US 1991-660428 19910225;
 US 1991-807439 19911213; US 1992-965190 19921023;
 US 1992-981133 19921124; US 1993-65656 19930521
 AB WO 9630938 A UPAB: 20050512
 Wafer having a layered superlattice is formed by applying a liq. precursor of polyoxyalkylated metals to a substrate and heating. The metals include Sr and Bi and at least one of Ta, Nb, Ti and Zr. The precursor optimises an electrical property in the layered superlattice material.
 USE - As a ferroelectric device with a superlattice layer located between a pair of electrodes (claimed) for e.g. IC devices.
 ADVANTAGE - The material has extremely low fatigue rates and polarisabilities as high as 25.

L47 ANSWER 4 OF 13 HCAPLUS COPYRIGHT ACS on STN
AN 2003:673084 HCAPLUS
DN 139:371555
ED Entered STN: 28 Aug 2003
TI A novel Ge MOS detector for 1.3 .mu.m and 1.5 .mu.m lightwave communication
AU Hsu, B.-C.; Hua, W.-C.; Shie, C.-R.; Lai, C.-C.; Chen, K.-F.; Yuan, F.; Liu, C. W.
CS Department of Electrical Engineering, National Taiwan University, Taipei, 106, Taiwan
SO Proceedings - Electrochemical Society (2002), 2002-4(Integrated Optoelectronics), 237-252
CODEN: PESODO; ISSN: 0161-6374
AB A novel, but simple metal-oxide-semiconductor detector using a Ge active layer was successfully demonstrated. The oxide is grown directly on Ge substrate by liq. phase deposition with suitable growth conditions. At neg. gate bias, the dark current of the photodetector is limited by the thermal generation of minority carrier in the inversion layer. The max. external quantum efficiency is estd. .apprx.50%. This novel Ge photodetector can be easily integrated into Si substrate by growing a Ge epi-layer on Si substrate.

L58 ANSWER 1 OF 7 WPIX COPYRIGHT THE THOMSON CORP on STN
 AN 2003-505349 [47] WPIX
 CR 1990-238925 [31]; 1992-316377 [38]; 1993-214414 [26]; 1993-214416 [26];
 1994-167303 [20]; 1994-167763 [20]; 1994-167765 [20]; 1994-176138 [21];
 DNN N2003-401292 DNC C2003-135159
 TI Integrated circuit for semiconductor devices has layered superlattice
 material having cerium, praseodymium, neodymium, promethium, samarium,
 europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium,
 ytterbium or lutetium.
 DC L03 P73 U11
 IN MCMILLAN, L D; PAZ DE ARAUJO, C A; SOLAYAPPAN, N; ARAUJO, C A P D
 PA (SYME-N) SYMETRIX CORP
 CYC 102
 PI WO 2003049172 A1 20030612 (200347)* EN 53
 US 2003152813 A1 20030814 (200355)
 AU 2002333658 A1 20030617 (200419)
 EP 1449241 A1 20040825 (200456) EN
 US 2004211998 A1 20041028 (200471)
 KR 2004071692 A 20040812 (200481) <--
 JP 2005512323 W 20050428 (200530) 37
 PRAI US 2001-998364 20011129; US 1992-965190 19921023;
 US 1992-993380 19921218; US 1995-405885 19950317;
 US 2000-686552 20001011; US 2004-851703 20040520
 AB WO2003049172 A UPAB: 20050512

NOVELTY - An integrated circuit comprises a substrate (502), and a thin film of layered superlattice material formed on the substrate. The thin film comprises cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium or lutetium.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(a) fabrication of memory device comprising forming a memory cell on the substrate including spontaneously forming a layered superlattice material structure in a thin film; and
 (b) fabrication of ferroelectric layered superlattice material, comprising: providing a substrate; providing a liquid precursor including metals for forming a layered superlattice material; applying the precursor liquid to the substrate; and treating the precursor on the substrate to form a layered superlattice material containing the metal on the first substrate.

USE - For semiconductor devices, e.g. MOSFET, ferroelectric FET, heterojunction bipolar transistors, bismuth complementary MOS, infrared sensitive cells, and capacitors.

ADVANTAGE - The invention has high dielectric constant materials (524) that do not degrade or break down over long periods of use. It does not only provide a ferroelectric memory that is more compatible with conventional integrated circuit elements, but also provide one that is more manufacturable and more environmentally compatible.

DESCRIPTION OF DRAWING(S) - The figure shows a cross-sectional view of a dynamic RAM and a ferroelectric RAM memory cell having a FET and a capacitor.

Memory 500

Substrate 502

High dielectric constant materials 524

Inter-level dielectric 536

Source electrode wiring 538

Top electrode wiring 539

L47 ANSWER 2 OF 13 HCPLUS COPYRIGHT ACS on STN
AN 2004:348590 HCPLUS
DN 142:268717
ED Entered STN: 29 Apr 2004
TI High efficient 820 nm MOS Ge quantum dot photodetectors for short-reach integrated optical receivers with 1300 and 1550 nm sensitivity
AU Hsu, B.-C.; Chang, S. T.; Shie, C.-R.; Lai, C.-C.; Chen, P. S.; Liu, C. W.
CS Graduate Institute of Electronics Engineering and Department of Electrical Engineering, National Taiwan University, Taipei, Taiwan
SO Technical Digest - International Electron Devices Meeting (2002) 91-94
CODEN: TDIMD5; ISSN: 0163-1918
PB Institute of Electrical and Electronics Engineers
DT Journal
LA English
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 48, 76
AB A metal-oxide-semiconductor (MOS) Ge quantum dot photodetector is demonstrated. The oxide is grown directly on Ge substrate by liq. phase deposition (LPD). The photodetector has the responsivity of 130, 0.16, and 0.08 mA/W under the wavelength of 820 nm, 1300 nm, and 1550 nm, resp. The dark current is extremely low (0.06 mA/cm²). The high performance of Ge quantum dot MOS photodetectors at 820 nm makes it feasible to integrate optoelectronic devices into the Si chip for short-reach optical communication.
IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(fabrication and characterization of Ge quantum dot optical detectors and receivers)
RN 7440-21-3 HCPLUS
CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

High Efficient 820 nm MOS Ge Quantum Dot Photodetectors for Short-Reach Integrated Optical Receivers with 1300 and 1550 nm Sensitivity

B.-C. Hsu^a, S. T. Chang^a, C.-R. Shie^a, C.-C. Lai^a, P. S. Chen^b, and C. W. Liu^{a,b}

^aGraduate Institute of Electronics Engineering and Department of Electrical Engineering,
National Taiwan University, Taipei, Taiwan, R. O. C.

^bERSO/ITRI, Hsinchu, Taiwan, R. O. C.
E-mail: chee@cc.ee.ntu.edu.tw

Abstract

A metal-oxide-semiconductor (MOS) Ge quantum dot photodetector is demonstrated. The oxide is grown directly on Ge substrate by liquid phase deposition (LPD). The photodetector has the responsivity of 130, 0.16, and 0.08 mA/W under the wavelength of 820 nm, 1300 nm, and 1550 nm, respectively. The dark current is extremely low (0.06 mA/cm²). The high performance of Ge quantum dot MOS photodetectors at 820 nm makes it feasible to integrate optoelectronic devices into the Si chip for short-reach optical communication.

Introduction

The interest of silicon-based optoelectronic devices grows rapidly in the last decade (1). However, due to the large absorption length ($\sim 16 \mu\text{m}$) of Si at 820 nm (2) and the forbidden absorption at 1300 and 1550 nm, the Si-based photodetector has limited detection efficiency and wavelength range. The incorporation of Ge into Si can not only increase the cut-off wavelength, but also enhance the absorption efficiency (small absorption length). The strained Ge could have an absorption length of $0.1 \mu\text{m}$ or less at the wavelength of 820 nm. In this paper, we use the metal-oxide-semiconductor (MOS) tunneling structure (3) with Ge quantum dot to implement the photodetector at 820 nm with high responsivity and extremely low dark current ($< 1 \text{ mA/cm}^2$). The low temperature ($\sim 50^\circ\text{C}$) liquid phase deposited (LPD) SiO_2 is used as gate dielectric material to avoid the high temperature thermal oxidation, which induces the Ge-related defects during oxidation. A 5-layer Ge quantum dots with $\sim 2 \text{ nm}$ wetting layers is used as a light absorbing layer, together with Si, Ge, and a $\text{Si}_{0.8}\text{Ge}_{0.2}$ multi-layer structure for comparison.

Strained SiGe/Ge

Fig. 1 shows the bandgap and cut-off wavelength vs strained and relaxed Ge mole fraction. As Ge mole fraction increases, the maximum absorption wavelength also increases. The shadowed area represents the laser bandwidth in our experiment. Fig. 2 shows the absorption length at 820, 1300, and 1550 nm vs Ge mole fraction. The absorption length

decreases as the Ge mole fraction increases. For the large Ge fraction, the shadowed areas indicate the uncertainty of the estimation. The incorporation of strained Ge/SiGe into optoelectronic devices makes devices particularly useful over the important fiber optic communications wavelengths, and can be applied to the fiber optic communications.

Ge Quantum Dots Fabrication

The Si/Ge quantum dots are prepared by UHVCVD (ultra high vacuum chemical vapor deposition) on p-type Si (001) substrates. The structure is shown in Fig. 5(a). After Si buffer layer of 50 nm was grown, 5 periods of Ge/Si bilayers were grown to form the self-assembled Ge dots at temperature of 600°C under the Stranski-Krastanov (SK) growth mode (4). The Ge layers are separated by 50 nm Si spacer layers. A 3 nm (nominal thickness) Si cap was deposited above the top layer of self-assembled Ge layer as the starting layer for the subsequent LPD oxide deposition. All UHVCVD layers are p-type with the estimated concentration on the order of $1 \times 10^{16} \text{ cm}^{-3}$. For comparison, RTO (Rapid Thermal Oxidation) was also performed. As a result, the LPD oxide yields larger external quantum efficiency than the rapid thermal oxide (Fig. 3).

Liquid Phase Deposition Oxide

To avoid material degradation such as strain relaxation and Ge out diffusion, the low temperature oxide is often required to reduce the thermal budget of SiGe device process. LPD is a promising low-temperature process for SiO_2 formation with the low thermal budget and low cost. A simplified mechanism of LPD growth was originally proposed by Nagayama et al. (5) based on the reaction of H_2SiF_6 with water to form hydrofluoric acid and solid SiO_2 .



However, the time for solution preparation was too long in this LPD process. Therefore, we used the LPD method with short preparation time (6). The experimental flow diagram for the LPD process is illustrated in Fig. 4. First, the silicic acid ($\text{SiO}_2 \cdot x\text{H}_2\text{O}$) was added to hydrofluosilicic acid (H_2SiF_6 , 3 mol/l) at the temperature of 35°C . The solution was then stirred for 3 hrs. Next, the solution was filtered to remove the undissolved silica. H_2O was then added to the saturated

4.3.1

solution. Si, Ge, Ge quantum dot, and $\text{Si}_{0.8}\text{Ge}_{0.2}$ multi-layer structure were used in this experiment. The native oxide was removed by dipping in diluted HF solution before the LPD process. The substrates were then placed into the immersing solution at 50°C. One interesting observation of LPD oxide on Ge quantum dot samples is that SiO_2 dots are formed directly on Ge dots, as shown in Fig. 5(b) and Fig. 6. The tensile strain field on the Si cap of self-assembled quantum dots can have preferential oxide deposition during LPD process. The oxide dots are formed on the tensile strained area of Si cap, and are aligned vertically with Ge dots embedded in the Si caps.

Photodetector

Fig. 7 shows the typical dark and photo current of a Ge quantum dot detector on p-type substrate. The fiber is pointed to the edge of the gate electrode and the photo-generated carriers can be collected by electrode by lateral drift and diffusion, as shown in the inset of Fig. 7. Note that the photocurrent is relatively independent of applied voltage, and the device can operate close to zero volt bias. Fig. 8 shows the band diagram of a Ge quantum dot NMOS detector under inversion bias. The deep depletion region is formed at inversion bias due to the tunneling of LPD oxide. The photoelectrons are generated in the deep depletion region, and are swept toward the gate electrode. The photoelectrons tunnel from the active layers to the Al gate electrode through the trap-assisted tunneling of LPD oxide. Since the band offset is mainly on the valence band, the electrons in the conduction band is less scattered by the conduction band discontinuity, as compared to holes in the valence band with large valence band discontinuity. The dark current of Si, Ge, Ge quantum dot, and $\text{Si}_{0.8}\text{Ge}_{0.2}$ multi-layer MOS devices are shown in Fig. 9. Note that the complex structure of valence band due to the wetting layer and quantum dots has little effects on our NMOS, where electron transport dominates. The dark current is mainly determined by thermal generation through the defects in the deep depletion region and the interface states. Thus, the Ge quantum dot device with a smaller bandgap has a larger dark current, as compared to the Si device.

Fig. 10, Fig. 11, and Fig. 12 are the responsivity and efficiency of devices under 820, 1300 and 1550 nm lightwave exposure, respectively. For 820 nm detection, the Ge quantum dot device has a very high external quantum efficiency (20%) similar to the Ge device. With the insertion of Ge quantum dots, the efficiency increases by a factor 10 as compared to the Si device. All the efficiency reported here is the external quantum efficiency. Due to the reflection of Si (~35 % at 820 nm) and the coupling loss, the internal quantum efficiency should reach 30%. This indicates extremely low defect density is formed during the UHV/CVD growth as well as the LPD process, and the defect-related recombination (if any) does not seriously degrade the efficiency. The dark current is as low as 0.06

mA/cm^2 for Ge quantum dot devices, while the dark current of typical Ge pin devices is $20 \text{ mA}/\text{cm}^2$ (7). For 1300 nm detection wavelength (Fig. 11), the responsivity of Ge quantum dot devices drops to $0.16 \text{ mA}/\text{W}$, due to the insufficient thickness of active layers, while Ge devices still have the responsivity of $100 \text{ mA}/\text{W}$. The responsivity of $\text{Si}_{0.8}\text{Ge}_{0.2}$ multi-layers is only $0.04 \text{ mA}/\text{W}$, due to the small Ge fraction in the films. For 1550nm detection (Fig. 12), the responsivity of the Ge quantum dot devices is $0.08 \text{ mA}/\text{W}$, while the responsivity of Ge devices is still around $75 \text{ mA}/\text{W}$. The quantum dot MOS detectors can also be operated at 850 nm (not shown here) with high responsivity ($> 300 \text{ mA}/\text{W}$). Note that the LPD oxide quality affects the device performance a lot. Therefore, to have best device performance, both the LPD process and the quantum dot structures should be optimized.

Conclusions

The MOS Ge quantum dot device can detect the wavelength of 820 nm, 1300 nm, and 1550 nm, with the responsivity of 130, 0.16, and $0.08 \text{ mA}/\text{W}$, respectively. The bias voltage can be as low as zero volt. The dark current is as low as $0.06 \text{ mA}/\text{cm}^2$. The detection efficiency of quantum dot device at 820 nm is close to the Ge device. The high performance of Ge quantum dot MOS detectors with LPD oxide at 820 nm makes it feasible to integrate optoelectronic devices into the Si chip for short-reach optical communication.

Acknowledgments

The authors would like to acknowledge Chun Liang Lin and Prof. Lon A. Wang of Optical Fiber Communication and Sensor Lab (OFC&S), Department of Electrical Engineering, National Taiwan University for the responsivity measurement of the Ge MOS detector. This work is partially supported by National Science Council, ROC, under contract nos. (91-2120-E-002-007, and 91-2215-E-002-027)

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- (7) S. Fama, L. Colace, G. Masini, G. Assanto, and Hsin-Chiao Luan, "High performance germanium-on-silicon detectors for optical communications," *Appl. Phys. Lett.*, vol. 81, no. 4, pp. 586-588, 2002.

4.3.2

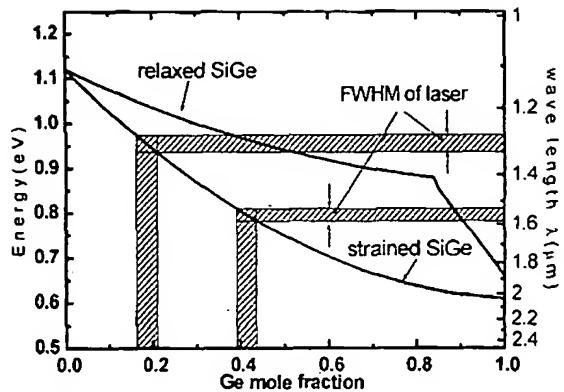


Fig. 1 The bandgap and cut-off wavelength vs Ge mole fraction. As Ge mole fraction increases, the maximum absorption wavelength also increases. The shadowed area represents the laser bandwidth in our experiment.

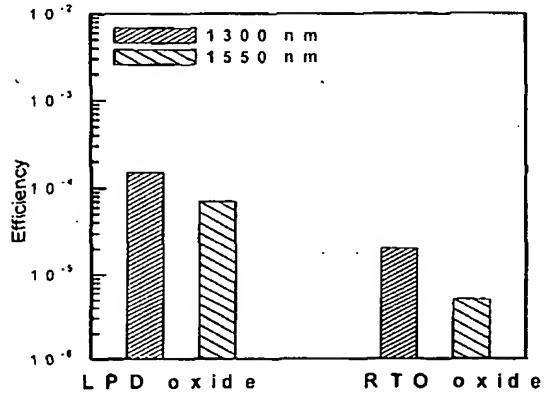


Fig. 3 The characteristics of Ge quantum dot detectors with RTO and LPD oxide. The MOS detector with RTO oxide has low efficiency.

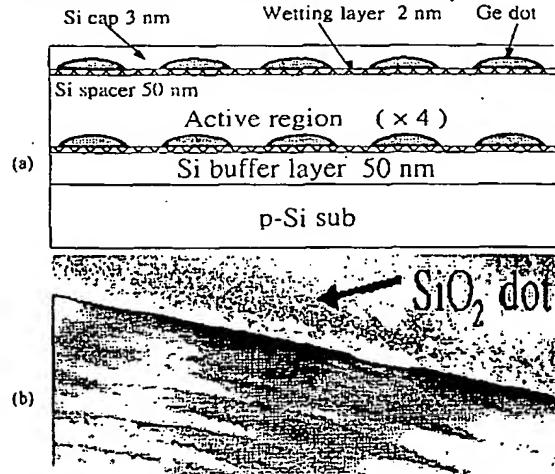


Fig. 5 (a) The structure of 5-layer Ge quantum dot devices prepared by UHV/CVD. Note that the top Ge quantum dots have a Si cap of 3 nm. (b) The TEM photograph.

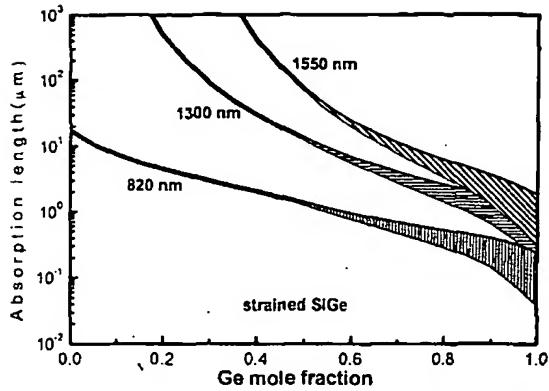


Fig. 2 The absorption length at 820, 1300, and 1550 nm vs Ge mole fraction. The absorption length decreases as the Ge mole fraction increases. For the large Ge fraction, the shadowed areas indicate the uncertainty of the estimation.

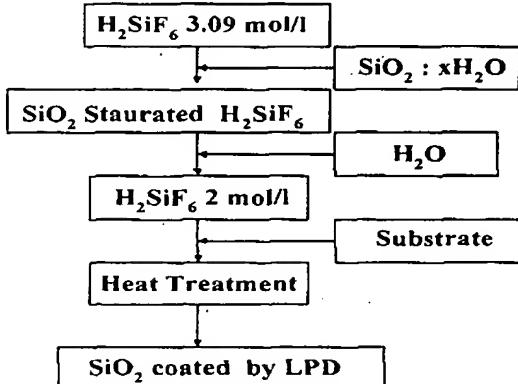


Fig. 4 The process flow of the liquid phase deposition.

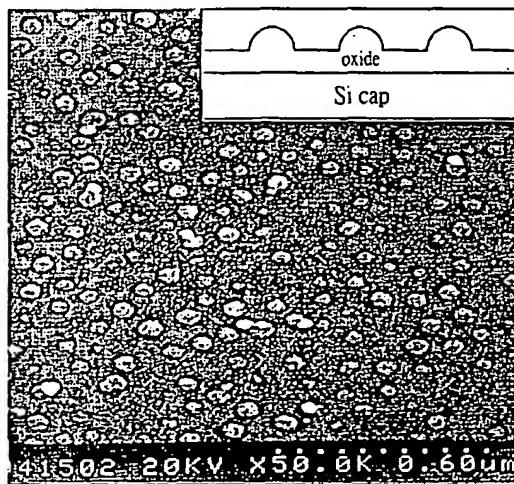


Fig. 6 The SEM morphology of quantum dot samples after the LPD process. The strain induced oxide dots are deposited directly on self-assembled Ge islands.

4.3.3

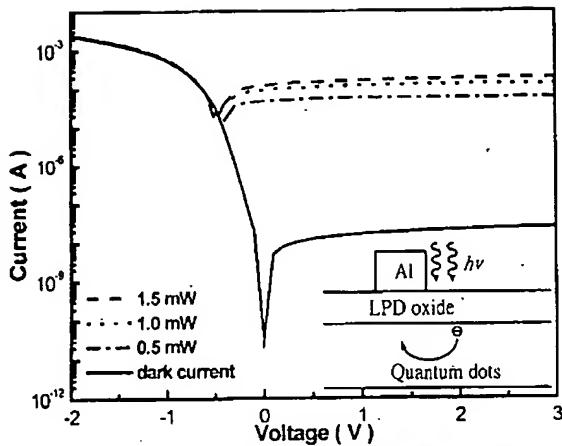


Fig. 7 The I-V characteristics of a quantum dot MOS detector under 820 nm lightwave exposure. The photo-generated carriers can be collected by gate electrode through the lateral drift and diffusion.

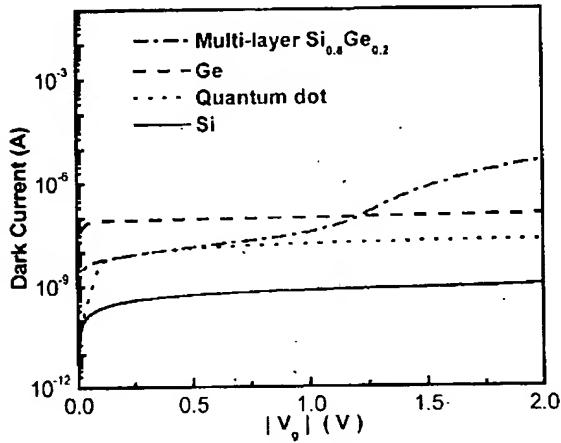


Fig. 9 The dark current of all 4 devices with LPD oxide.

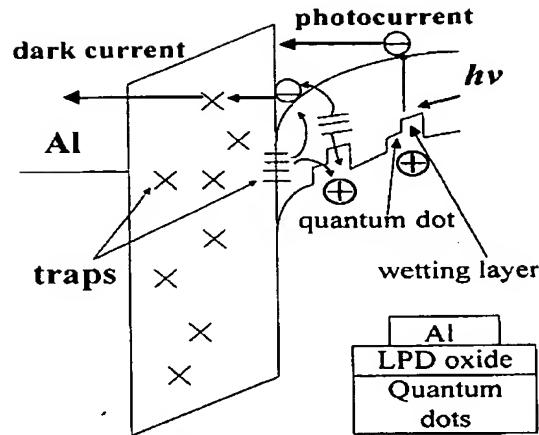


Fig. 8 The band diagram of a Ge quantum dot NMOS detector under inversion bias and the device structure. The photo-generated electrons tunnel through LPD oxide.

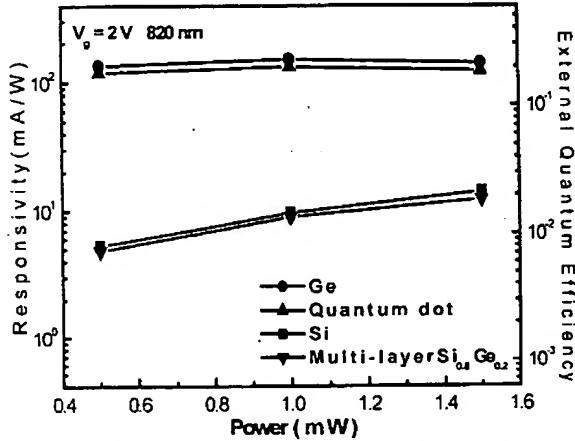


Fig. 10 The responsivity and efficiency at 820 nm. The Ge quantum dot device has a similar efficiency to Ge device.

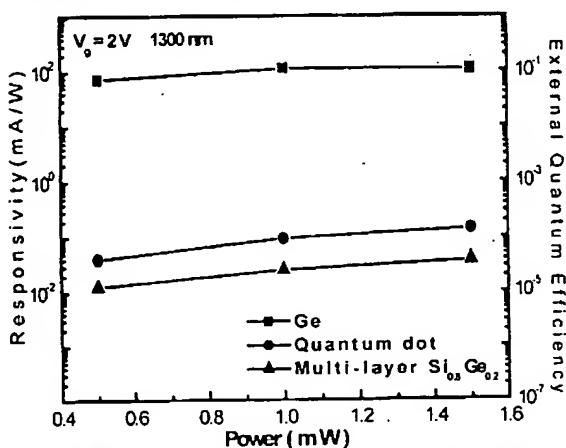


Fig. 11 The responsivity and efficiency at 1300 nm. The efficiency of quantum dot detectors is larger than multi-layer Si_{0.8}Ge_{0.2} detectors.

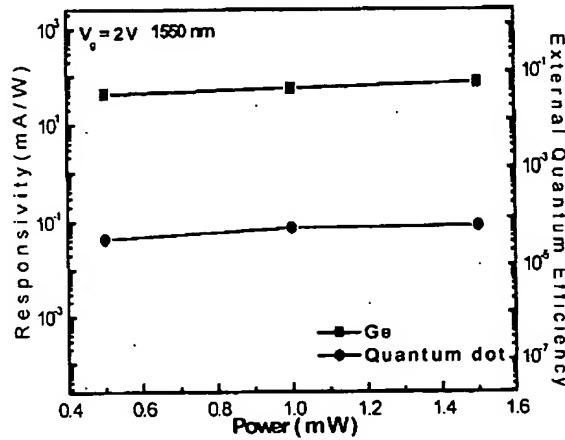


Fig. 12 The responsivity and efficiency at 1550 nm. Only Ge and Ge quantum dot detectors have response at 1550 nm.

4.3.4

L34 ANSWER 5 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2004:802503 HCAPLUS

DN 141:323939

ED Entered STN: 01 Oct 2004

TI Method for forming a metal oxide film for capacitor

IN Koyanagi, Kenichi; Sakuma, Hiroshi

PA Japan

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004192036	A1	20040930	US 2004-808193	20040324
	JP 2004296814	A2	20041021	JP 2003-87577	20030327
	CN 1534741	A	20041006	CN 2004-10031392	20040326
	DE 102004016162	A1	20041111	DE 2004-102004016162	20040326
PRAI	JP 2003-87577	A	20030327		

AB A method for forming a capacitor insulation film includes the step of depositing a monoat. film made of a metal by supplying a metal source including the metal and no O, and depositing a metal oxide film including the metal by using a CVD technique. The method provides the metal oxide film having higher film properties with a higher throughput.

IT 10028-15-6, Ozone, processes

RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(CVD forming metal oxide film for capacitor)

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

0_0_0

IT 7440-21-3, Silicon, processes

RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(CVD forming metal oxide film for capacitor on)

RN 7440-21-3 HCAPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

L34 ANSWER 1 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2005:219585 HCAPLUS

DN 142:289437

ED Entered STN: 11 Mar 2005

TI Methods of forming metal thin films, lanthanum oxide films, and
high dielectric films for semiconductor devices using atomic
layer deposition

IN Park, Ki-yeon; Kim, Sung-tae; Kim, Young-sun; Park, In-sung; Yeo,
Jae-hyun; Lee, Yun-jung; Im, Ki-vin

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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PI US 2005051828	A1	20050310	US 2004-828596	20040421
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PRAI KR 2003-25533 A 20030422

AB The present invention provides methods of forming metal thin
films, La oxide films and high dielec. films. Comps. of metal thin
films, La oxide films and high dielec. films are also provided. Further
provided are semiconductor devices comprising the metal
thin films, La oxide films and high dielec. films provided herein.

IT 10028-15-6, Ozone, processes

RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical,
engineering or chemical process); PROC (Process); USES (Uses)
(forming metal thin films, lanthanum oxide films, and high dielec.
films for semiconductor devices using at. layer deposition)

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

0_0_0

L53 ANSWER 8 OF 19 WPIX COPYRIGHT THE THOMSON CORP on STN

AN 1993-346486 [44] WPIX

DNN N1993-267615 DNC C1993-153382

TI Semiconductor circuitry structure mfr., e.g. capacitor MOS transistor, pixel, etc. - comprises growing buffer layer of high dielectric constant oxide layer contg. no lead or bismuth, directly or indirectly on semiconductor substrate etc..

DC L03 U11 U12 U14

IN SUMMERFELT, S R

PA (TEXI) TEXAS INSTR INC

CYC 7

PI EP 568064 A2 19931103 (199344)* EN 9

R: DE FR GB IT

JP 06224184 A 19940812 (199437) 7

TW 232748 A 19941021 (199501)

US 5393352 A 19950228 (199514) 7

EP 568064 A3 19940406 (199522)

US 5650646 A 19970722 (199735) 7

US 5912486 A 19990615 (199930)

EP 568064 B1 19990714 (199932) EN

R: DE FR GB IT

DE 69325614 E 19990819 (199939)

PRAI US 1992-876930 19920501; US 1993-127222

19930927; US 1995-395016 19950227; US

1997-842863 19970417

AB EP 568064 A UPAB: 19931213

Mfr. comprises (i) growing a buffer layer (26) of a non-Pb/Bi contg. high dielectric constant oxide layer directly or indirectly on a semiconductor substrate (10), and (ii) depositing a Pb/Bi-contg. high dielectric constant oxide (28) on to the buffer layer.

The substrates are pref. Si or GaAs. A layer of Ge (12) (or a metal) is pref. epitaxially grown directly or indirectly on the semiconductor substrate and the buffer layer is grown on the Ge layer. When the substrate is Si, the Ge layer is pref. less than 1 nm in thickness and the buffer layer is less than 10 nm thick. A 2nd non-Pb/Bi-contg. oxide layer (30) may be grown on top of layer (28), and a conducting layer (32) may be grown on top of layer (30). Both high dielectric constant oxides are pref. ferroelectric oxides and/or titanates. The non Pb/Bi-contg. oxide is BaSrTiO₃, the Pb/Bi-contg. oxide is lead zirconate titanate, and both layers may be epitaxially grown. Both oxides may be single crystals or the Ge layer may be grown on a non-single crystal SiO₂, Si₃N₄ or SiO₂/Si₃N₄ layer which is directly or indirectly grown on the semiconductor substrate.

USE/ADVANTAGE - Structures include capacitors, MOS transistors, pixels for light detecting arrays and those for electro-optic applications. The Ge buffer layer is effective and compatible with Si and many oxides. It allows ferroelectrics to be directly grown on to Si wafers to form non-volatile, non-destructive read out memory cells and increases the capacitance of large dielectric constant oxide films.

ABEQ US 5393352 UPAB: 19950412

The semiconductor structure is fabricated by (a) growing a Ge layer (in) directly on a semiconductor substrate, (b) growing a perovskite buffer layer of Pb and Bi free high dielectric constant oxide on.

L58 ANSWER 3 OF 7 WPIX COPYRIGHT THE THOMSON CORP on STN
 AN 1995-256972 [34] WPIX
 CR 1995-218447 [29]; 1995-256971 [34]; 2001-427784 [41]
 DNN N1995-198254 DNC C1995-117259
 TI Orienting thin film of ferroelectric material for electronic or light modulation device - comprises perovskite conductive thin film formed on single crystal substrate, ferroelectric material formed on above thin film.
 DC L03 U11 U12 U14 V04 V07 X12
 IN NASHIMOTO, K
 PA (XERF) FUJI XEROX CO LTD
 CYC 2
 PI JP 07133199 A 19950523 (199534)* 9
 US 5650362 A 19970722 (199735) 16
 US 5656382 A 19970812 (199738) 16<--
 JP 3199091 B2 20010813 (200148) 7
 ADT JP 07133199 A JP 1993-297621 19931104; US 5650362 A Div ex US 1994-325583 19941019, US 1995-439371 19950511; US 5656382 A Cont of US 1994-325583 19941019, US 1996-620752 19960318; JP 3199091 B2 JP 1993-297621 19931104
 FDT JP 3199091 B2 Previous Publ. JP 07133199
 PRAI JP 1993-297621 19931104; JP 1993-297620 19931104;
 JP 1993-297622 19931104
 AB JP 07133199 A UPAB: 20010829
 An epitaxial or orienting perovskite ABO_3 conductive thin film is formed on a single crystal substrate. An epitaxial or orienting ABO_3 thin film of a ferroelectric substance is formed on the above thin film. The substrate has an epitaxial or orienting buffer layer on its surface.
 USE - The orienting thin film of the ferroelectric material is used for an electronic device, including a nonvolatile memory or a capacitor, or a light modulation device.
 ADVANTAGE - Providing the epitaxial or orienting oxide electrode between the ferroelectric substance and the substrate produces light modulation device allowing low voltage driving, or a high performance switching device, including a nonvolatile memory. The epitaxial or orienting oxide electrode and the epitaxial or orienting thin film of the ferroelectric material are formed on the semiconductor substrate. The result produces the light modulation device on GaAs-based semiconductor laser, or a light integrated circuit on an Si semiconductor integrated circuit.
 ABEQ. . . US 5650362UPAB: 19970828
 A process for preparing a mono-axially oriented conductive thin film comprising coating a single crystal substrate with a metal oxide precursor solution comprising an unhydrolyzed organometallic compound and subjecting the coating layer to thermal decomposition followed by annealing the coated substrate. . .
 ABEQ. . .
 structure oxide conductive thin film of BaPbO_3 oriented in only one direction which is obtained by coating a single crystal substrate with a solution of a metal oxide precursor comprising an un-hydrolysed organometallic compound, thermally decomposing the coating layer, and annealing the coated substrate.

L34 ANSWER 17 OF 19 HCAPLUS COPYRIGHT ACS on STN

AN 2000:534917 HCAPLUS

DN 133:128678

ED Entered STN: 04 Aug 2000

TI Organometallic deposition of dielectric layers using supercritical fluids such as CO₂ in semiconductor device fabrication

IN Morita, Kiyoyuki; Otsuka, Takashi; Ueda, Michihito

PA Matsushita Electric Industrial Co., Ltd., Japan

SO Eur. Pat. Appl., 32 pp.

CODEN: EPXXDW

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1024524	A2	20000802	EP 2000-101398	20000125
CN 1264159	A	20000823	CN 2000-100676	20000127
JP 2000357686	A2	20001226	JP 2000-18265	20000127
TW 472295	B	20020111	TW 2000-89101390	20000127
US 2002083959	A1	20020704	US 2000-492350	20000127
US 6541278	B2	20030401		
US 2003003604	A1	20030102	US 2002-230249	20020829
US 6713316	B2	20040330		
US 2003003770	A1	20030102	US 2002-230258	20020829
US 6716663	B2	20040406		
PRAI JP 1999-18597	A	19990127		
JP 1999-104873	A	19990413		
US 2000-492350	A1	20000127		

AB A semiconductor substrate is placed within a housing. By supplying organometallic complexes and CO₂ in a supercrit. state into the housing, a BST thin film is formed on a Pt thin film, while at the same time, C compds., which are produced when the BST thin film is formed, are removed. The solv. of C compds. in the supercrit. CO₂ is very high, and yet the viscosity of the supercrit. CO₂ is low. Accordingly, the C compds. are removable efficiently from the BST thin film. An oxide or nitride film may also be formed by performing oxidn. or nitriding at a low temp. using H₂O in a supercrit. or subcrit. state, for example.

IT 7722-84-1, Hydrogen peroxide, uses 10028-15-6,

Ozone, uses

RL: NUU (Other use, unclassified); USES (Uses)
 (oxidizing agent; organometallic deposition of
 dielec. layers using supercrit. fluids such as carbon dioxide in
 semiconductor device fabrication)

RN 7722-84-1 HCAPLUS

CN Hydrogen peroxide (H₂O₂) (9CI) (CA INDEX NAME)

HO—OH

RN 10028-15-6 HCAPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

O—O—O

L36 ANSWER 5 OF 10 HCPLUS COPYRIGHT ACS on STN

AN 2002:358781 HCPLUS

DN 136:357461

ED Entered STN: 14 May 2002

TI Ozone-containing aqueous oxidizing
solution and manufacture of lithium-containing metal
oxide by using it for cathode active mass of secondary battery

IN Maruta, Junichi

PA Japan Storage Battery Co., Ltd., Japan

CODEN: JKXXAF

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	-----	-----	-----	-----
PI JP 2002137923	A2	20020514	JP 2000-330737	20001030

PRAI JP 2000-330737 20001030

AB The inversion relates to a method for manufg. Li-contg. metal
oxide by low-temp. synthesis using O₃ as oxidant under pH control of
reaction soln. The oxidizing soln. contains alkali
metal chloride and O₃. The method for manufg. Li-contg.
metal oxides involves a process for O₃-oxidn. of
transition metal hydroxides contg. Ni, Co, Mn, and/or Fe in a
Li-ion-contg. soln. at pH 7.6-10.4. The oxidizing soln
. is stably in basic pH range for a long period, and the Li-contg. metal
oxide can be manufd. in high yield.

IT Battery cathodes

Oxidizing agents

(aq. oxidizing soln. contg. alkali
metal chloride and O₃ for manuf. of Li-contg. metal oxide for
battery cathode active mass)

IT 10028-15-6, Ozone, uses

RL: NUU (Other use, unclassified); TEM (Technical or engineered material
use); USES (Uses)

(aq. oxidizing soln. contg. alkali
metal chloride and O₃ for manuf. of Li-contg. metal oxide for
battery cathode active mass)

RN 10028-15-6 HCPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

0_0_0

L34 ANSWER 10 OF 19 HCPLUS COPYRIGHT ACS on STN

AN 2002:522076 HCPLUS

DN 137:81377

ED Entered STN: 12 Jul 2002

TI Method for depositing thin layers on a porous substrate, fuel cell and fuel cell comprising such a thin layer

IN Cassir, Michel; Bernay, Cecile; Lincot, Daniel; Goubin, Fabrice

PA Renault, Fr.

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2002053798	A1	20020711	WO 2001-FR4102	20011220
FR 2818993	A1	20020705	FR 2000-17225	20001228
FR 2818993	B1	20031128		
EP 1356133	A1	20031029	EP 2001-989640	20011220
PRAI FR 2000-17225	A	20001228		
WO 2001-FR4102	W	20011220		

AB The invention concerns a method for depositing on the surface of a porous substrate, thin layers of a solid ionic conductor comprising .gtoreq.1 base oxide and .gtoreq.1 doping agent. The deposition is carried out from precursor I_n of the metal ion of 1 of the base oxides, precursor II oxidizing the precursor I_n and, precursor III_m of 1 of the oxides inputting 1 of the doping agents; n and m are each an integer .gtoreq.1. The method involves providing .gtoreq.1 base oxide in a 1st sequence and .gtoreq.1 doping agent in a 2nd sequence. The 1st sequence is repeated 1-10 times, the 2nd sequence is repeated only once; the entire process constitutes a cycle. The deposition is produced for a (1st/2nd) sequence ratio detd. on the basis on the (doping agent(s)/basic oxide(s)) at. ratio and for a no. of cycles detd. on the basis of the thickness of the thin layer, and finally for a specific contacting duration between precursors and substrate. The invention also concerns a fuel cell, and a cell contg. such a thin layer.

IT 10028-15-6, Ozone, uses

RL: TEM (Technical or engineered material use); USES (Uses)
(precursor in deposition of thin layers on porous substrate in manuf.
of fuel cells)

RN 10028-15-6 HCPLUS

CN Ozone (8CI, 9CI) (CA INDEX NAME)

0_0_0

L34 ANSWER 9 OF 19 HCAPLUS COPYRIGHT ACS on STN
 AN 2002:777943 HCAPLUS
 DN 137:302573
 ED Entered STN: 11 Oct 2002
 TI Metalloamide and aminosilane precursors for CVD formation of dielectric thin films
 IN Baum, Thomas H.; Xu, Chongying; Hendrix, Bryan C.; Roeder, Jeffrey F.
 PA Advanced Technology Materials, Inc., USA
 PATENT NO. KIND DATE APPLICATION NO. DATE
 ----- ----- ----- -----
 PI WO 2002079211 A1 20021010 WO 2002-US9390 20020327
 US 2002175393 A1 20021128 US 2001-823196 20010330
 US 2002187644 A1 20021212 US 2001-954831 20010918
 US 6869638 B2 20050322
 EP 1373278 A1 20040102 EP 2002-728580 20020327
 JP 2004529495 T2 20040924 JP 2002-577835 20020327
 PRAI US 2001-823196 A 20010330
 US 2001-954831 A 20010918
 WO 2002-US9390 W 20020327
 AB A CVD method of forming gate dielec. thin films on a substrate is described which uses metallocamide compds. of the formula M(NR1R2)p, or [I where M is Zr, Hf, Y, La, lanthanide series elements, Ta, Ti, or Al; N is nitrogen; each of R1 and R2 is same or different and is independently selected from H, aryl, perfluoraryl, C1-C8 alkyl, C1-C8 perfluoroalkyl, alkylsilyl; and x is the oxidn. state on metal M;] and an aminosilane compd. of the formula HpSiAq(NR1R2)4-p-q, or [II where H is hydrogen; p is 0-3; Si is Si; A is a halogen; q is 0-3; N is nitrogen; each of R1 and R2 is same or different and is independently selected from the group consisting of H, aryl, perfluoraryl, C1-C8 alkyl, and C1-C8 perfluoroalkyl; and n is from 1-6]. By comparison with the std. SiO2 gate dielec. materials, these gate dielec. materials provide low levels of C and halide impurity.
 IT 10028-15-6, Ozone, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (oxidizing gas; metallocamide and aminosilane
 precursors for CVD formation of dielec. thin films)
 RN 10028-15-6 HCAPLUS
 CN Ozone (8CI, 9CI) (CA INDEX NAME)

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L34 ANSWER 8 OF 19 HCAPLUS COPYRIGHT ACS on STN
 AN 2002:975882 HCAPLUS
 DN 138:48438
 ED Entered STN: 27 Dec 2002
 TI Atomic-layer deposition of metal oxide using organometallic complex having
 .beta.-diketone
 IN Lee, Jung Hyun; Kim, Dae Sik; Min, Joseph; Cho, Young Jin
 PA Samsung Electronics Co., Ltd., S. Korea
 PATENT NO. KIND DATE APPLICATION NO. DATE

 PI JP 2002371359 A2 20021226 JP 2002-79875 20020322
 KR 2002095342 A 20021226 KR 2001-33532 20010614
 US 2003008072 A1 20030109 US 2002-160111 20020604
 US 6752869 B2 20040622
 PRAI KR 2001-33532 A 20010614
 AB The title method involves letting the organometallic
 complex chemisorb on a substrate and oxidizing by
 activated O radicals.
 IT 10028-15-6, Ozone, uses
 RL: NUU (Other use, unclassified); USES (Uses)
 (at.-layer deposition of metal oxide by radical oxidn
 . of chemisorbed organometallic complex having
 .beta.-diketone)
 RN 10028-15-6 HCAPLUS
 CN Ozone (8CI, 9CI) (CA INDEX NAME)

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not semiconductor?